

The STAR detector upgrades for the BES-II and at forward rapidity

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The Beam Energy Scan phase II program (BES-II) at the Relativistic Heavy Ion Collider (RHIC) is examining the center-of-mass collision energy region from 7.7 GeV to 19.6 GeV which was determined from the results of BES-I. Key measurements such as the net proton kurtosis, the directed flow and the dilepton production are possible during BES-II with an order of magnitude better statistics due to the Low Energy RHIC electron Cooling (LReC) upgrade of RHIC and the STAR detector upgrades. The BES-II upgrades comprise the inner Time Projection Chamber (iTPC), endcap Time Of Flight (eTOF) and Event Plane Detector (EPD), which are all fully commissioned and operational since beginning of 2019.

Beyond BES-II, the STAR Collaboration is currently designing, constructing, and installing a suite of new detectors in the forward rapidity region ($2.5 < \eta < 4$), enabling a program of novel measurements in pp, pA and AA collisions. To fully explore this physics, the forward upgrade needs superior detection capability for neutral pions, photons, electrons, jets and leading hadrons by adding charged-particle tracking and electromagnetic and hadronic calorimetry to STAR's capabilities at forward rapidity.

In this talk, we will present the details of the STAR detector upgrades for the BES-II and beyond. The scientific opportunities enabled from these detector upgrades will be discussed.